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**Incentives, Foreign Assistance, and Fiscal Behaviour
in Less Developed Countries**

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INTRODUCTION

Current foreign assistance effectiveness research focuses primarily on the relationships between aid receipts and overall changes in a less developed country's macroeconomic conditions. The majority of the literature develops and tests mathematical models to measure the strength of relationship between foreign assistance receipts and economic growth¹. Unfortunately, this approach to aid effectiveness research is deficient in two ways. First, the current literature does not accord sufficient consideration to the role of institutions and institutional arrangements in determining how recipient governments allocate, disperse, and monitor foreign assistance expenditures. Although recipient countries vary in the type, strength, and organization of their institutions, current models fail to consider the mediating and channeling roles institutions perform that could influence the effectiveness of foreign assistance. The existing literature fails to account for how decision-makers' behavior varies within different institutional arrangements.

Another deficiency is that existing models do not adequately explain or test how foreign assistance receipts influence the fiscal behavior of government leaders in less developed countries. More specifically, the concern that foreign assistance may be fungible and thus ineffective at meeting the donor's development goals remains a major concern for scholars, yet the current research does not specifically analyze the institutions or incentives inherent to a foreign assistance situation² that make fungibility more likely. Research by Heller (1975), Khan and Hoshino (1992), White (1993), Pack and Pack (1990; 1993), Schwalbenberg (1998), and Svensson (2000) investigates whether or not foreign assistance is fungible, but their models only examine macro-level economic relationships between foreign assistance receipts, tax levels, private consumption, and government expenditures. This literature fails to explore the uncertainties, expectations, motivations, and competing incentives inherent to a foreign assistance situation that partially determine the degree to which a recipient considers aid fungible.

¹ For example, see Chenery and Strout (1966); Papanek (1972; 1973); Mosley, Hudson, and Horrell (1987); and Boone (1996).

² A "foreign assistance situation" refers to the multi-dimensional and temporal space in which foreign assistance occurs. See "Defining a Foreign Assistance Situation," below.

Furthermore, the present research does not offer sufficient empirical or experimental verification of *how* key actors behave in foreign assistance situations. This deficiency is a major obstacle to a better understanding and modeling of how foreign assistance actually works in less developed countries. Scholars need to bridge the foreign assistance, fiscal behavior, bureaucratic behavior, and rational choice literatures to better comprehend how key actors in less developed countries behave in foreign assistance situations. This connection is especially critical given donor concerns regarding the fungibility of foreign assistance and the political and economic implications of fungibility for both the donor and recipient.

As an initial step in addressing the multiple shortcomings of recent foreign assistance effectiveness research, I propose a new approach to studying the effectiveness of foreign assistance. I contend the effectiveness of foreign assistance³ and the degree to which it is fungible can only be understood through an institution-based model of fiscal behavior that accounts for the competing incentives actors face in the presence of foreign assistance. Institutional arrangements influence, constrain, and channel the behavior of key decision-makers operating in a foreign assistance situation. Specifically, the institutional structure of a foreign assistance situation affects the way in which decision-makers behave fiscally in the absence, presence, potential presence, or potential loss (absence) of foreign assistance receipts⁴. Initially, game theory and rational choice theory can be employed to construct and define the institution-based incentives and payoff structures for donors and recipients. A game-theoretic analysis reveals the uncertainties donors and recipients encounter in a foreign assistance situation, which affects their expectations and influences the degree to which foreign assistance is fungible. Once a donor commits to foreign assistance, it can offer more assistance, change the level and type of assistance, or withdraw funding in the future, all of which create uncertainty for recipient governments, thus influencing the degree to which they perceive foreign assistance to be fungible. Recipients' current disposition of foreign assistance depends not only on present receipts, but is also forward-looking and based on expectations of the donor's future behavior.

³ A loose definition of "foreign assistance effectiveness" is the success of development projects as measured by the project's long-term sustainability by owners once donor(s) terminate outside funding and support.

The advantages of this approach to foreign assistance effectiveness research are numerous. First, this approach recognizes the importance of institutions and treats them as endogenous variables that influence actor behavior. Additionally, this research attempts to explicitly incorporate government decision-makers into the foreign assistance process. Although government decision-makers are crucial to locating, securing, and allocating funds for development, no other research specifically examines how incentives influence foreign assistance effectiveness. If foreign assistance alters recipients' aggregate fiscal behavior and thus the overall success of donor-funded development projects, then it is necessary to examine incentives actors face to gain a better understanding of the entire foreign assistance situation. Furthermore, this approach implicitly recognizes that foreign assistance-driven development is not a one-shot game as the current literature assumes. By examining the overall foreign assistance situation, the proposed model accounts for the temporal aspect of foreign assistance and development.

DEFINING A FOREIGN ASSISTANCE SITUATION

The concept of a foreign assistance situation recognizes that foreign assistance and development do not occur at an isolated single point in time, but are instead initiated at a point in time and carried into the future. The effectiveness of assistance-driven development depends on periodic funding over time, as well as donor and recipient commitment to and ownership of the development project⁴. Svensson (2000) and Aleš and Lane (2002) argue recipients' expectations of future foreign assistance receipts may influence their current fiscal behavior. According to Aleš and Lane, annual foreign assistance receipts are difficult for recipients to predict, which affects their budgeting process. They contend recipients devise three responses to the volatility inherent to foreign assistance flows. Recipients can adopt a flexible fiscal framework that allows them to adjust tax levels and expenditures upon the receipt of foreign assistance, draw from reserves to smooth out fluctuations in aid receipts, or they can issue debt instruments to finance variations in foreign assistance. The volatility of annual foreign assistance receipts creates uncertainty for the recipient, which influences its expectations of future fiscal health. The expectations

⁴ See definition of "foreign assistance situation" for details and complete permutations.

⁵ See Ostrom, Gibson, Shivakumar, and Andersson (2002) and The World Bank (1998) on the concept of ownership.

recipients form based on the uncertainty of future foreign assistance receipts directly affects the degree to which foreign assistance is fungible.

Because foreign assistance is volatile and unpredictable over time, it is necessary to consider both present and potential future foreign assistance receipts when analyzing problems of effectiveness and fungibility. A foreign assistance situation defines the action space (arena) in which a foreign assistance transaction/exchange occurs or *potentially* occurs. The foreign assistance situation defines the set of all possible relationships that may exist between a donor and a recipient in a temporal manner. It captures the multiple permutations of the donor-recipient relationship that exists or potentially exists when the time element is included. The foreign assistance situation acknowledges that foreign assistance relationships are not one-shot games by capturing both current and potential future donor-recipient relationships. The inclusion of the *possibility* of receiving foreign assistance or altering an existing foreign assistance relationship is important because it introduces the elements of uncertainty, expectation formation, and incentives into the proposed game-theoretic model of foreign assistance fungibility. Only by recognizing the time element inherent to the concept of a foreign assistance situation can an analyst understand how and why foreign assistance may be fungible, thereby illuminating possible policy solutions. Figure 1A illustrates an initial one-shot game, where the donor and recipient only interact for one period. Figure 1B illustrates the foreign assistance situation, which is an iterated game with feedback loops that allow for uncertainty and expectation formation.

LITERATURE REVIEW

The Effectiveness of Foreign Assistance

Early research examining foreign assistance focused primarily on the macroeconomic relationship between foreign assistance receipts and economic growth. Scholars considered foreign assistance to be "effective" if a regression analysis demonstrated a positive relationship between foreign assistance receipts and annual change in gross domestic product or another lagged growth variable. Chenery and Strout (1966) provide the intellectual foundation from which most subsequent foreign assistance effectiveness research has commenced. They argue domestic resource limitations and constraints act as

the critical obstacle to economic growth in less developed countries. The introduction of foreign assistance allows recipients to supplement and utilize their limited resources in the most productive manner. Chenery and Strout find that recipients of foreign assistance achieve average growth rates higher than they would in the absence of such inflows. They attribute foreign assistance's ability to fill the gap between investment and domestic savings as the operative mechanism permitting recipients to achieve higher rates of economic growth. Papanek (1973) reaches similar conclusions by analyzing the effect of foreign resources on economic growth and the relationship between foreign resources and domestic savings rates. He finds that foreign assistance does contribute to economic growth and argues the positive relationship exists because foreign assistance can fill the foreign exchange gap as well as the domestic savings gap.

Griffin and Enos (1970) provide a contrasting view of foreign assistance and its contribution to economic growth in less developed countries. Using a linear regression model of the amount of foreign assistance received and the rate of gross national product growth for fifteen African and Asian countries between 1962 and 1964, Griffin and Enos conclude no relationship exists between amount of aid received and economic growth. Griffin and Enos indict foreign assistance's disruption of savings and consumption patterns as the culprit for diminishing economic growth. As foreign assistance increases, consumption also rises, retarding domestic investment and savings. Foreign assistance hinders long-term economic growth by altering the composition of investment. Foreign assistance creates a bias toward capital-intensive industries, which cannot be endogenously sustained in the long-run. Most importantly, Griffin and Enos argue that foreign assistance impedes economic growth because it prevents the necessary institutional changes that are prerequisites for development from occurring. The receipt of foreign assistance eliminates incentives to undertake difficult institutional, economic, political, and social reforms necessary for long-term endogenously-sustained economic growth. Mosley, Hudson, and Horrell (1987) report similar findings, concluding that aid in the aggregate had no demonstrable effect on economic growth in recipient countries during the 1970s or 1980s. It is impossible to establish any statistically significant correlation between foreign assistance and economic growth in less developed countries.

Bowles (1987) extends Griffin and Enos' research by investigating whether a negative correlation exists between foreign assistance and domestic savings using time-series data. His conclusions contradict those of Griffin and Enos. Bowles concludes that a statistically significant relationship between foreign assistance and domestic savings rates does not exist in nine of the twenty countries examined. Bowles argues that generalizations concerning causal relationships and mechanisms between foreign assistance and domestic savings rates must be treated with caution. He maintains the complex social, economic, political, and social structures of less developed countries prevent the development of one unified theory of how foreign assistance affects economic growth. Snyder (1990) further critiques Griffin and Enos' research. Following Papanek (1973), Snyder notes that numerous factors, such as per capita income, wars, terms-of-trade changes, natural disasters, and political disturbances can significantly affect the distribution and use of foreign assistance. Snyder analyzes the effect of foreign assistance on domestic savings rates and controls for the effects of per capita income. He concludes Griffin and Enos' argument that aid-switching occurs in less developed countries is unfounded; foreign assistance has little influence on domestic savings.

Griffin and Enos' argument that foreign assistance impedes institutional development is bolstered by the work of Burnside and Dollar (1997) that focuses on the institutional quality of foreign assistance recipients. They contend foreign assistance's effectiveness at facilitating economic growth depends on the overall institutional structure and policy environment of the recipient. Countries with sound financial institutions, a strong regulatory environment, economic stability, and fiscal discipline will utilize foreign assistance better than states lacking these attributes. Using panel regression for fifty-six less developed countries and six 4-year periods between 1970 and 1993, Burnside and Dollar conclude that foreign assistance does have a positive effect on economic growth when the necessary institutions and policy frameworks exist. Foreign assistance facilitates economic growth in an economic environment with good fiscal, monetary, and trade policies. The World Bank (1998) reaches similar conclusions. The World Bank argues that foreign assistance can stimulate economic growth and development when the recipient creates the proper economic environment through stable fiscal, monetary, and trade policies.

Overall, the literature remains inconclusive as to whether or not foreign assistance contributes to economic development and growth in less developed countries. Problems of research methodology, data availability, case selection, number of observations, and period of study make definitive conclusions difficult (Gang and Khan, 1992). Although more recent studies, such as those by Burnside and Dollar (1997) and the World Bank (1998), suggest foreign assistance does contribute to economic growth and development under specific institutional arrangements, these studies do not specifically examine the connection between foreign assistance receipts and recipients' fiscal behavior. The question of "Is foreign assistance effective?" is distinct from the question "Is foreign assistance fungible?" Examining whether or not foreign assistance contributes to economic growth and development does not directly address how recipients' fiscal behavior changes in a foreign assistance situation.

The Fungibility of Foreign Assistance

The empirical research examining the fungibility of foreign assistance also remains inconclusive, plagued with many of the same methodological issues inherent to effectiveness research. Foreign assistance fungibility means recipients do not use funds in the manner intended by the donor. Pack and Pack (1993) suggest fungibility occurs when recipient governments circumvent donors' intentions by altering overall expenditure patterns. The World Bank (1998) considers aid to be fungible if recipient governments can use the resource as it chooses. The World Bank isolates three possible ways foreign assistance can be fungible: governments can use aid to fund tax cuts, increase discretionary spending, or reduce the fiscal deficit. Under each of these scenarios, the recipient uses foreign assistance funds to finance activities outside the scope of normal donor-funded development projects. The research yields mixed results when these three scenarios are empirically examined; some studies show no relationship between foreign assistance and changes in fiscal behavior, while others report the opposite.

Heller (1974) develops an original model to test how recipients adjust their fiscal behavior in the presence of foreign assistance receipts. Heller holds that government decision-makers maintain clearly differentiated preferences over revenue sources and expenditure types, which influence their fiscal

behavior in the presence of foreign assistance. Based on a time-series⁶ study of eleven African countries, Heller finds the receipt of grant-aid reduces tax levels and domestic borrowing while increasing consumption. In contrast, loan-aid increases total expenditures and investment. Grant-aid stimulates consumption more than loan-aid because recipients are unwilling to finance recurring expenditures through debt obligations. Khan and Hoshino (1992) also conclude that recipients treat grant-aid and loan-aid differently. Their research demonstrates loan-aid encourages investment while grant-aid is used primarily for consumption. They also show that grant-aid reduces domestic tax rates while loan-aid increases taxation efforts. In a case study of India, Gang and Khan (1992) offer similar results. They find that grant-aid and loan-aid do not affect government consumption. Loan-aid is completely invested in development projects that probably would not have been financed or implemented otherwise. Gang and Khan also demonstrate that in the presence of foreign assistance, a tax increase results in higher government consumption, and higher government consumption results in higher tax rates; consumption is financed through domestic revenue sources, not foreign assistance receipts.

In contrast, Dacy (1975) contends countries increase both consumption and investment with the receipt of foreign assistance, resulting in an overall decrease in domestic savings, causing lower levels of economic growth once donors withdraw foreign assistance. Dacy argues the introduction of foreign assistance facilitates government consumption of expensive re-occurring expenditures that require sustained foreign assistance. Foreign assistance allows recipient governments to increase consumption without undertaking difficult institutional and fiscal changes that would otherwise be necessary to support greater consumption. Foreign assistance erodes the incentive for prudent government expenditures, so governments undertake costly re-occurring project expenditures that cannot be supported without foreign assistance. Mosley, Hudson, and Horrell (1987) further develop this conclusion by arguing that governments attempt to maximize their own welfare in the face of budgetary constraints, and foreign assistance facilitates the removal or diminishment of budget constraints. Their model views foreign assistance inflows as a mechanism that acts to reduce the prices of goods and services that are supplied by

⁶ 1961 to 1971.

the development project. These price reductions are offset by an increase in prices for goods and services that are in high demand as a consequence of the development project. Foreign assistance inflows allow governments to finance re-occurring expenditures that would not be possible without foreign assistance. However, unlike Heller (1974), they find no relationship between foreign assistance receipts and private investment levels. Kimbrough (1986) also concludes that foreign assistance is fungible and recipients use foreign assistance to maximize their welfare.

Levy (1987) reaches conclusions opposite Heller (1974). Levy concludes that less developed countries treat foreign assistance the same as domestically generated revenue. The marginal propensity to consume and the marginal propensity to save for both domestically generated revenue and foreign assistance receipts are identical, suggesting foreign assistance is not fungible. Levy concludes that foreign assistance not intended for emergency or disaster relief is not consumed but invested by the recipient government. Levy's research undermines Heller's contention that government decision-makers hold preferences over revenue sources and expenditure types. Because the marginal propensity to save is the same for both domestic and foreign revenue sources, decision-makers do not consider revenue source when making budget decisions. Thus, decision-makers may not hold unique preferences as Heller argues. Alternately, if decision-makers do hold revenue source preferences, Levy's research indicates actors are not acting in accordance with their preferences. Schwalbenberg (1998) also argues that foreign assistance has no demonstrable affect on fiscal behavior. He concludes that the choice and adoption of harmful economic policies are independent of foreign assistance receipts.

In a case study of Indonesia, Pack and Pack (1990) argue that categorical foreign assistance is not fungible. They conclude that foreign assistance is spent for its intended purposes. Furthermore, foreign assistance does not alter the recipient's development budget or its non-development current expenditures. Contrary to Heller (1974), Pack and Pack (1990) find that foreign assistance does not displace domestic revenue sources; instead, tax rates rise in response. Interestingly, Pack and Pack (1993) reach the opposite conclusion in a study of the Dominican Republic's fiscal behavior. They determine that foreign

assistance in the Dominican Republic is fungible, with most receipts going toward debt repayment and deficit reduction.

As a whole, the foreign assistance fungibility research suffers many of the same deficiencies as the foreign assistance effectiveness studies. Pack and Pack's (1990; 1993) research highlights the problem of determining foreign assistance fungibility using macroeconomic models; in their analysis of Indonesia and the Dominican Republic, they reach opposite conclusions regarding the fungibility of foreign assistance using similar models. One reason the current fungibility literature is inconclusive and often contradictory is because it does not consider the incentives foreign assistance creates for recipients to potentially alter their fiscal behavior. The existing models do not analyze the incentives foreign assistance receipts generate that make foreign assistance fungible from the recipient's perspective.

INSTITUTIONAL ANALYSIS AND THE FOREIGN ASSISTANCE SITUATION

The Institutional Analysis and Development Framework (IAD) developed by Ostrom and others⁷ can be used to analyze a foreign assistance situation to determine under what circumstances recipients alter their fiscal behavior and the institutional arrangements that permit or encourage fungibility. The participants in a foreign assistance situation are two or more countries. To simplify the analysis and game-theoretic model, I will assume only two countries are participants⁸. The participants can hold one of two positions: donor, who provides foreign assistance funds, and recipient, who receives funds from the donor. The donor must choose to either offer or not offer foreign assistance to the recipient, who in turn must decide to accept or reject the foreign assistance funds. The donor will decide which action to pursue based on the information it possesses regarding the recipient's need and past experiences with foreign assistance. The recipient will determine which action to choose based on its fiscal and development needs and expectation of future needs. The perception that foreign assistance can address the recipient's fiscal and development needs and positively influence sustainable, long-term economic

⁷ See Ostrom, Gardner, and Walker (1994), Chapter 2, for complete details.

⁸ Easterly (2002) and Ostrom *et. al.* (2002) explain that multiple donors and recipients exist. The existence of multiple donors creates an "aid cartel," which influences how donors and recipients interact and the effectiveness of foreign assistance.

growth links information about action choices to outcomes. Donors and recipients assign costs and benefits to each potential action and outcome. Costs and benefits will be fully developed later because they depend on the exact interaction between the donor and recipient and their respective preferences and expectations of future performance.

The Donor

Each actor operating within the action situation holds unique preferences, information processing capabilities, selection criteria, and resources. The donor holds preferences over the type of foreign assistance to offer, whether or not a potential recipient rejects or accepts a foreign assistance offer, and how the recipient spends the funds. Ostrom *et. al.* (2002) identify three basic types of foreign assistance funding: grants, where no repayment is required; credits (loans) which must be repaid; and guarantees that facilitate the securing of private capital sources. Heller (1974), Khan and Hoshino (1992), and Gang and Khan (1992) distinguish between grant-aid and loan-aid and examine the difference in recipients' fiscal behavior based on the type of foreign assistance. In its reporting of foreign assistance statistics, the Organization for Economic Cooperation and Development (OECD) acknowledges that foreign assistance may also include a hybrid mix of both grants and loans (2002). Based on this research, I limit the type of foreign assistance a donor can offer to grant-aid, loan-aid, or mixed-aid. Grant-aid, and loan-aid, and mixed-aid are the primary forms of foreign assistance and the majority of the empirical work examines these types of expenditures, which provides sufficient justification for limiting the types of foreign assistance a donor may offer in this model.

A foreign assistance donor holds preferences over the type of aid offered to a recipient. In general, a donor should prefer loan-aid to mixed-aid and grant-aid. This preference ordering makes sense from an incentive-based perspective. As Ostrom *et. al.* (2002) and Khan and Hoshino (1992) imply, donors should prefer loan-aid to mixed-aid and grant-aid because loan-aid must be repaid, creating incentives for governments not to misdirect or misallocate assistance receipts. Loan-aid also enhances recipients' ownership of the development project because it represents a debt for the country. Because mixed-aid and grant-aid only possess partial or zero debt obligations, they create fewer incentives for

recipients to use foreign assistance in the intended manner. Thus, if donors are concerned with preventing fungibility and achieving the stated goals of a development project, they will prefer loan-aid over mixed-aid and grant-aid.

Donors hold imperfect information and, at times, highly asymmetric information regarding recipients' foreign assistance needs and use of funds. The kind of foreign assistance recipients need takes a variety of forms, ranging from basic infrastructure development aimed at improving transportation, sanitation, and communication networks, to human capital investments that build education and health care facilities, to humanitarian and emergency assistance to address famine and other natural disasters (Chambers, 1983; Ostrom *et. al.*, 2002; The World Bank, 1998; Pack and Pack, 1990; Svensson, 2000). Donors cannot know with complete certainty the exact needs or conditions of a recipient country *a priori*, creating the possibility that donors may fund the "wrong" development which, from the recipient's perspective, provides an opportunity to use foreign assistance in a manner contrary to the donor's wishes. With incomplete knowledge of the recipient's assistance needs and internal conditions, the probability of fungibility rises.

Two types of information asymmetry exist between the donor and recipient. Information is asymmetric with respect to the needs of the recipient and with respect to how the funds will actually be used once dispersed. Because donors hold incomplete information regarding the recipient's development and financing needs while recipients do not, a level of information asymmetry exists. Recipients may know exactly the type and level of foreign assistance that is needed, but they may act strategically and not fully reveal this information to a donor to induce more funding than is actually needed. If recipients are strategic actors, they can use information asymmetry to their advantage to induce more donor assistance than would otherwise be offered or required. Similarly, information asymmetry exists between the donor's intended use of foreign assistance funds and the recipient's actual expenditure. As Pack and Pack (1993) and Ostrom *et. al.* (2002) argue, the actual use of foreign assistance is difficult for donors to monitor once allocations have been made. Monitoring the use of foreign assistance is troublesome for donors because they have limited, and often times incomplete, information regarding how recipients

allocate and expend aid funds. It is hard for donors to determine if foreign assistance is being used for tax reductions, debt repayment, or alternate expenditures instead of the designated development project because less developed countries often times lack transparent budgeting practices, do not adhere to strict budgeting policies, rely on repetitive budgeting and cash-flow budgeting techniques, engage in off-budget transactions, possess inefficient and ineffective budget oversight, or employ creative tactics to make expenditures opaque (Wildavsky 1975; Premchand 2000). Additionally, foreign funded development projects may occur over a period of years, which makes exact tracking and monitoring of foreign assistance expenditures even more difficult. Incomplete and asymmetric information regarding recipients' needs and use of foreign assistance makes measuring the effectiveness and degree of fungibility difficult for donors.

Moral hazard and principal-agent problems exacerbate incomplete and asymmetric information dilemmas, making it even more difficult for donors to effectively monitor foreign assistance expenditures (Ostrom *et. al*, 2002). The issue of moral hazard raises the possibility that the most neediest recipients will seek foreign assistance, yet these countries are the ones most likely to lack the institutions, political stability, transparency, and regimes necessary to effectively and efficiently utilize foreign assistance⁹. If this is the case, donors will have an especially difficult time monitoring compliance of foreign assistance expenditures. The primary principal-agent problem relates to the potential conflict between donor and recipients' goals. The donor may offer foreign assistance to attain a specific goal, such as the construction of a new "modern" irrigation system, but the recipient may view construction as a secondary or tertiary goal that is subordinate to more immediate needs for foreign currency infusions¹⁰. When the degree of incomplete and asymmetric information about the recipient's needs and domestic conditions is high, the likelihood of principal-agent problems substantially increases. Once they secure foreign assistance, recipients have an easier time using the funds for unintended purposes, since the donor lacks complete information and monitoring compliance is difficult.

⁹ See The World Bank (1998); Burnside and Dollar (1997); Boone (1996); Svensson (2000); and Fayissa and El-Kaissy (1999).

Donors face substantial uncertainty determining whether or not to offer foreign assistance to a less developed country given the significant degree of incomplete and asymmetric information regarding the need for and use of aid. Svensson (2000) assumes donors offer aid based on recipients' needs as well as the donor's own interests. However, this conception does not precisely identify the selection criteria donors employ to decide whether or not to offer assistance to a less developed country. Little research exists on the criteria donors use in selecting which recipients and projects to fund. More than likely, this information is proprietary, specific to the donor agency. Donor agencies may use different evaluative criteria based on the recipient country, type of proposed development project, method of funding, past experience with the project and/or recipient, and other variables. Donors could also use measures of fiscal discipline, budget priorities, and technical efficiency as evaluative criteria for offering foreign assistance, as suggested by the World Bank (1998).

By definition, donors hold the potential to bring significant resources to the action situation. From an objective standpoint, donors offer the potential of technical knowledge, funding, implementation and management skills, personnel, and development experience to the recipient. However, donors may not offer these resources if ideology or self-interest are the primary motivations for foreign assistance, or if the donor has inadequate knowledge of the targeted recipient's needs and local conditions. Donors driven by ideology or self-interest may not be truly committed to a development project but are instead using the recipient to gain a strategic advantage. For example, some scholars argue that during the Cold War, the United States' foreign assistance to countries in Africa, Latin America, and parts of Europe was motivated by strategic calculations to gain alliances with geopolitically important states in an effort to contain the spread of communism and the Soviet Union. Instead of viewing foreign assistance as a critical opportunity to promote development, donors perceived foreign assistance as a critical foreign policy and military tool to be wielded for strategic geopolitical purposes". When donors pursue military or strategic goals under the guise of foreign assistance, they may not be fully committed to the

" See Easterly (2002) for an in-depth analysis of how donor-goals do not meet recipient needs.

" For an overview of this literature, see Browne (1990; 1997).

development project, in which case the extent of their resources remains ambiguous. Likewise, when donors do not know recipients' needs or local conditions, they may be unable to obtain and channel the proper resources to ensure effectiveness, ownership, and sustainability.

The Recipient

Foreign assistance recipients also hold unique preferences, information processing capabilities, selection criteria, and resources. The recipient possesses preferences over whether or not foreign assistance is offered, the type of foreign assistance it receives (or chooses to accept), and the degree to which it maintains latitude in determining how to spend foreign assistance receipts. Recipients presumably prefer to accept rather than reject foreign assistance. Hypothetically, a recipient may prefer to reject foreign assistance if its terms are too stringent, the proposed financing interferes with domestic priorities, or if it would be a political liability for the ruling party. A recipient prefers grant-aid over mixed-aid and loan-aid because grant-aid provides the greatest degree of latitude. Grant-aid allows recipients maximum freedom in decision-making and expenditure decisions; in essence, grant-aid provides the highest degree of potential fungibility. Recipients prefer mixed-aid over loan-aid for two reasons. First, mixed-aid contains some amount of grants that will not have to be repaid, and second, the grant component of mixed-aid allows some degree of flexibility and a better chance of fungibility. Loan-aid is least preferred because recipients incur a future cost of borrowing; loan-aid must be repaid, whereas grant-aid does not need to be repaid and only part of mixed-aid must be repaid. Loan-aid is presumably preferred over no aid because it allows recipients to undertake development projects that may otherwise not occur. It is possible, however, that a recipient could choose not to accept foreign assistance if the proposed terms do not coincide with its preferences. For example, Pack and Pack (1990; 1993), Mosley, Hudson, and Horrell (1987), and Heller (1974) assume recipient governments maintain indifference curves over preferred expenditure combinations and revenue sources. If the terms of foreign assistance do not conform to the recipient's preferences, as described by indifference curves, it is possible they would choose not to accept foreign assistance.

Recipients also face imperfect, incomplete, and asymmetric information in a foreign assistance situation. Ales and Lane (2002) argue recipients have a difficult time predicting future foreign assistance receipts; at best, they possess imperfect and incomplete information whether they *will* receive future assistance and, if so, the *level* of future receipts. The uncertainty of future foreign assistance flows influences recipients' expectations, which ultimately affects their fiscal behavior. According to Svensson (2000), recipients' expectations of future foreign assistance receipts influence their fiscal behavior. He demonstrates that a country's expectation that it will receive foreign assistance creates incentives for its decision-makers not to undertake difficult policy adjustments. The ability to accurately predict future foreign assistance receipts creates perverse incentives for the recipient to engage in poor, sub-optimal fiscal policies.

Recipients possess imperfect and incomplete information regarding foreign assistance flows because the ultimate decision to provide funds is determined by the donor. Although the recipient can request foreign assistance and work with a donor to secure funding, the ultimate decision to offer and commit to funding lies with the donor. When a recipient requests foreign assistance funding, it does not know with complete certainty the level of funding, what projects) will be funded, how long the funding will last, or when the assistance will commence, making information about the foreign assistance situation imperfect and incomplete from the recipient's perspective. Since the donor does know the details and logistics of foreign assistance funding and its longevity and scope, the information received by the recipient is asymmetric¹². The donor possesses its own preferences and level of commitment to foreign assistance and the projects) being funded and, since it does not make this information completely available to the recipient, information asymmetry exists.

Assuming the donor has accepted the recipient's request for foreign assistance and has committed to the projects).

Little research exists examining how recipients select donors and the type of foreign assistance that is ultimately accepted¹³. As previously noted, recipients could rely on preferences and indifference curves over revenue sources and expenditures to determine the type of outside funding to seek and for which projects to locate assistance. Alternately, recipients could base their selection criteria on domestic needs. Recipients could determine the sectors most needing outside assistance, discover the most appropriate type of funding to meet the sector need, then select a donor willing to fund the needed project according to the recipient's preferred financing method. This approach to selection assumes both the recipient and donor possess a high degree of ownership and commitment to the development project. Finally, it is possible that recipients do not really hold any firm selection criteria for reviewing and selecting foreign assistance-financed development projects. Some recipients may be willing to accept any foreign assistance offer if they are operating under the assumption that any infusion of foreign funds for any development project will help the country. Although this option is rather pessimistic, some countries in desperate need may be willing to accept any foreign assistance if they perceive it as at least improving their situation.

The "recipient" designation is a holder for a variety of countries that are heterogeneous with respect to ethnic diversity, language, culture, religion, education levels, infant mortality rates, life expectancy¹⁴, social capital, regime type, debt, political and economic stability, natural resource endowments, colonial legacy, openness to trade, level of development, and macroeconomic conditions. Because recipient countries vary significantly over a large number of variables, it is difficult to exactly specify the resources a particular recipient brings to a foreign assistance situation. Some recipients may offer little in resources because of high debt levels, low natural resource endowments, low levels of education, poor health conditions, and ineffective governments and institutions (Barro, 1991; Becker, Murphy, and Tamura 1990; Brander, 1992; Helliwell, 1994). For example, in 2000 Rwanda received

¹³ This paper does not focus on donor selection or examine the decision processes recipients undertake to decide whether or not to seek foreign assistance. The analysis in this paper assumes recipients have already undergone this phase of analysis and only examines the foreign assistance situation after the donor offers foreign assistance.

¹⁴ Infant mortality and life expectancy are proxies for overall health levels.

over US\$175 million in net official development assistance funds from OECD Development Assistance Committee (DAC) countries¹⁵. However, it is doubtful Rwanda was able to bring many resources to the foreign assistance situation, since it had only a 66.8% adult literacy rate, 40.2 years of life expectancy, 51.2% of its population living below the national poverty line and 84.6% of the population living under the international poverty line¹⁶, only 8% of its population using adequate sanitation facilities, and 40% of its population undernourished¹⁷. Because human capital is an essential component to economic growth and development (United Nations Development Programme, 1990; Sen, 1999), it is unlikely Rwanda was able to offer many resources to the foreign assistance situation. Other recipients may potentially offer more resources because of higher development levels. In 2000, Indonesia received over US\$ 1.6 billion in net official development assistance funds from OECD DAC countries¹⁸. Indonesia also had higher measures of human capital development: a 86.9% adult literacy rate, 66.2 years of life expectancy, 27.1% of its population living below the national poverty line and 55.3% living under the international poverty line¹⁹, 66% of the population using adequate sanitation facilities, and only 6% undernourished²⁰.

Although these measures do not fully capture or measure the possible effectiveness of foreign assistance, they do provide a sense of the potential resources a recipient brings to the foreign assistance situation. The resources recipients' can bring to a foreign assistance situation are endogenously determined and unique to each country. For the purposes of this study, I will assume recipients' resources are homogeneous and that recipients possess sufficient domestic resources to make foreign assistance effective if they choose to. Because the focus of this study is on how foreign assistance alters recipients' fiscal behavior and the degree to which aid is fungible, I am more concerned with how recipients behave once they receive foreign assistance and form expectations about future receipts, not how the foreign assistance funds are actually translated into projects.

¹⁵ Data from the OECD International Development Statistics online database.

¹⁶ Set at US\$2 per day.

¹⁷ Statistics from the 2002 United Nations Human Development Indicators 2002. Online: <http://hdr.undp.org/reports/global/2002/en/indicator/indicator.cfm?File=ctv f RWA.html>.

¹⁸ Data from the OECD International Development Statistics online database.

¹⁹ Set at US\$2 per day.

A MODEL OF FUNGIBILITY

To understand how foreign assistance affects recipients' fiscal behavior and the determinants of fungibility, I propose a two-staged, iterated two-player "fungibility game." The two players are the donor and recipient who possess the respective attributes developed in the previous section. The first stage of the game involves donors deciding whether or not to offer foreign assistance and recipients determining whether or not to accept foreign assistance offered by the donor. The second stage of the game requires donors to determine what type of foreign assistance to offer and what signals to send about future foreign assistance receipts. In this game, the recipient must choose its fiscal behavior depending on the type of foreign assistance offered and its reaction to the donor's signals regarding future foreign assistance flows; the recipient's fiscal behavior is a function of the type of foreign assistance offered and the donor's signals of future funding levels. I will first outline the basic parts of each game and then elaborate on the components.

The first stage of the game examines the donor's decision to offer foreign assistance and the recipient's decision to accept foreign assistance. The model makes two assumptions at the beginning of the first-stage game. First, the model assumes the recipient possesses some need for foreign assistance and consults with the donor about receiving funding. Second, the model assumes the donor employs its selection criteria to evaluate the recipient for foreign assistance. The recipient and donor both perceive a level of foreign assistance need, which is based on their respective information sets and capabilities. Because of information asymmetries and incomplete information from the donor's perspective, the type of assistance and level of assistance perceived as necessary may differ between the recipient and donor. After perceiving a need for foreign assistance and consulting with the recipient, a donor may choose one of two options: to offer or not offer foreign assistance. If the donor does not offer foreign assistance, a recipient may choose to continue consultation with the donor in an attempt to convince the donor to make a foreign assistance offer. If the donor does choose to make a foreign assistance offer, the recipient then must decide whether or not to accept the offer. If the recipient chooses to accept the offer, the first-stage

Statistics from the 2002 United Nations Human Development Indicators 2002. As cited.

game ends and the second-stage game begins. If the recipient chooses not to accept the offer, the donor may decide to formulate and tender another foreign assistance offer. Figure 2 illustrates the first stage of the fungibility game.

The second stage of the fungibility game describes the possible types of foreign assistance a donor may offer, as well as the signals a donor may send regarding the future of foreign assistance receipts. The recipient's fiscal behavior depends on the type of foreign assistance received as well as the signals it receives from the donor. There are three types of foreign assistance a donor may offer: grant-aid, loan-aid, and mixed-aid. Because of the iterated nature of the foreign assistance situation, the donor can commit to each of these types of aid for either one-period (t) or multiple periods ($t+k$). Thus, a donor can make six offers to a recipient: one-period grant-aid, loan-aid, and mixed-aid; or multiple period grant-aid, loan-aid, and mixed-aid. Additionally, no matter what type of foreign assistance the donor offers, it can also make one of three generic signals regarding the future of its foreign assistance flows: no future of foreign assistance, possible future of foreign assistance, or remain ambiguous as to whether or not it will offer any type of foreign assistance in the future. Of course, each of these signals must convey the type of foreign assistance the donor could offer in the future. For example, when the donor wants to signal "no future of foreign assistance," it must be specific and signal the type of foreign assistance that will not be offered in the future; the donor must signal no future grant-aid, loan-aid, mixed-aid, or remain ambiguous as to which type of foreign assistance will not be offered in the future. Furthermore, a signal of "no future grant-aid" can be interpreted by the recipient as implying that grant-aid will not occur in the future, but loan-aid or mixed aid could be offered. Unless the donor makes a clear signal that no future foreign assistance of any type will be offered, recipients may conclude that the other two types of foreign assistance could be offered in the future even though one type of foreign assistance is excluded from consideration. Because the donor can choose from six types of foreign assistance and send one of nine signals for every type of foreign assistance offered, the donor actually possesses fifty-four possible offers from which to choose. Table 1 illustrates the possible permutations of the offers and signals a donor may send to the recipient.

Based on the type of foreign assistance offered and the corresponding signal regarding future foreign assistance flows, the recipient must determine both its response to the offer and its fiscal behavior for the period(s) following aid receipt. In stage one of the fungibility game, the recipient decides whether or not to accept an offer of foreign assistance. In stage two, the recipient must determine its fiscal behavior in the presence of foreign assistance; the recipient must decide how to allocate its budget given the addition of non-domestic revenue. The recipient possesses four options for fiscal behavior in the presence of foreign assistance: it can maintain the *status quo* and allocate foreign assistance for the intended development project, in which case foreign assistance is not fungible. Alternately, the recipient government can use aid to fund tax cuts, increase discretionary spending, or reduce the fiscal deficit as suggested by the World Bank (1998), in which case foreign assistance is fungible. Thus, the recipient's choice set is: $\{D, C, S, F\}$, where D signifies undertaking the development project, C indicates tax cuts, S stands for increase discretionary spending not related to the development project, and F is the reduction of fiscal deficits. Figure 3 illustrates the recipient's possible choices. The recipient places a value on each of these options, notated as $V_D, V_C, V_S,$ and V_F , based on its indifference curves for budget allocations. Because the recipient must choose one of four options in response to a foreign assistance inflow, the recipient must consider the opportunity costs of the three foregone options when determining its fiscal behavior. $C_D, C_C, C_S,$ and C_F represent the various opportunity costs a recipient incurs when choosing one fiscal behavior over the others. Opportunity cost is the value that the recipient does not incur from the foregone activity or, more formally, $C_x = \sim V_x$. For example, if the recipient chooses D, it incurs the opportunity costs ($C_C + C_S + C_F$); if the recipient chooses C, it incurs opportunity costs ($C_D + C_S + C_F$). Once a recipient receives foreign assistance from a donor, the central problem is to determine how it will allocate the foreign assistance funds within its budget, ultimately determining whether or not foreign assistance is fungible.

Assuming recipient governments are utility maximizers operating within budget constraints (Svensson, 2000; Kimbrough, 1986; Gang and Khan, 1991; Khan and Hoshino, 1992; Schwalbenberg, 1998; White, 1993), fiscal behavior in period / will depend on the type of foreign assistance offered, the

donor's signal regarding future foreign assistance flows (periods $t + k$), and a strategic cost/benefit analysis. The cost/benefit analysis allows recipients to determine if foreign assistance is fungible by comparing the value of their four alternatives ($V_D, V_C, V_S,$ and V_F) against the opportunity cost incurred by each alternative ($C_D, C_C, C_S,$ and C_F) and the value of potential future foreign assistance flows that could be lost if current aid is misappropriated. Recipients, being rational, strategic actors with their own unique set of preferences, budget constraints, and utility functions, first examine the type of foreign assistance the donor offers and the donor's signal regarding future foreign assistance flows. Recipients then review their four options for allocating foreign assistance funds and weigh the relative benefits and costs of pursuing each alternative. When comparing alternatives, recipients look not only at the value of their current foreign assistance receipts and alternatives, but also at the potential value of future foreign assistance receipts, based on the signals provided by the donor; recipients incorporate the potential value of future foreign assistance receipts when determining their fiscal behavior. Recipients must weigh the present value and present discounted value²¹ of foreign assistance flows and the four expenditure options in period t against potential future foreign assistance flows in periods $(t+k)$ which could be lost if the recipient misallocates funding in period t . Recipients discount future foreign assistance receipts because there is not complete certainty they will actually receive the funds and because present funds are worth more than future funds promised at a future date. I will examine the one-time donor offer and the multiple period offer each in turn. Because of the large number of possible permutations of donor-recipient interactions, I will focus on only a few to illustrate how the type of foreign assistance and signals regarding future aid flows create incentives for recipients to treat foreign assistance as fungible.

One Period Assistance

Recall that a donor may offer foreign assistance as either a one-period (t) or multiple period ($t+k$) contract. The one-period offer of grant-aid, loan-aid, or mixed-aid and its associated signal regarding future foreign assistance flows influences the recipient's fiscal behavior. When the donor makes a one-period offer and unambiguously signals no future foreign assistance flows of any type, the donor

²¹ See Mishkin (2001) for discussion and calculation of these concepts.

essentially eliminates the iterated nature of the fungibility game. By articulating that absolutely no future foreign assistance funds will be offered to the recipient, the donor eliminates any incentives that may exist for the recipient to use foreign assistance for its intended purpose so it can demonstrate effectiveness and improve its chances of receiving more aid in the future. The likelihood of fungibility increases when a donor offers a one-period aid package and signals no future foreign assistance flows will occur. Under this scenario, grant-aid is particularly fungible, since it does not extract any material costs from the recipient and the recipient does not have an incentive to use the grant-aid properly so as to receive future foreign assistance flows. Grant-aid will be fungible if $[C_b < x]$ where \mathcal{C} , L , J , A and $A = \{V_c, V_s, V_f\}$. Loan-aid will be fungible depending on the cost imposed on the recipient for borrowing combined with the opportunity cost of not undertaking $D(C_b)$, compared to the benefits incurred from using the money in an alternate manner ($V_c, V_s, \text{ or } V_f$). For loan-aid to be fungible, the cost of the loan plus C_b must be less than value of the project to which the loan-aid is redirected: ($V_c, V_s, \text{ or } V_f$). More formally, loan-aid is fungible if $[(L * (1+i)^n) + C_b < * , \bullet]$, where L is the loan amount, i is the interest rate (cost of borrowing), and n is the period of the loan²². The fungibility of mixed-aid depends on its grant-aid component relative to the loan-aid element. The higher the level of grant-aid relative to loan-aid, the more likely it is that mixed-aid will be fungible. Conversely, as the loan-aid component increases, recipients begin to perceive mixed-aid as financially equivalent to loan-aid. Mixed-aid is composed of grant and loan components, so $M = (G + L)$, where M is the amount of mixed-aid and G represents the amount of grant-aid. The grant portion imposes no costs on the recipient, while the loan component imposes a cost of borrowing. Mixed-aid will be fungible if $[G > (L * (1+i)^n)]$ and $[C_b < \mathcal{C}]$. Because mixed-aid imposes some cost through the loan-aid component, recipients possess some incentive to be cautious in the degree of fungibility.

When a donor only excludes one type of future foreign assistance as a possibility, the recipient's incentives for treating foreign assistance as fungible change. If the donor offers one-time foreign assistance and signals no future of a specific type of foreign assistance, it implies the other two types of

²² This model assumes loans will be fully paid in the future by the recipient, an assumption that may not hold true, given the large debt levels of many foreign assistance recipients. The assumption is made to simplify the model and

foreign assistance remain a possibility in the future, which alters the recipient's incentives to treat foreign assistance as fungible. For example, the donor may offer one time grant-aid and signal no future grant-aid, which implies that loan-aid and mixed-aid are still possibilities in the future. To determine whether or not the one period grant-aid is fungible when future loan-aid or mixed-aid is implied, the recipient must compare the present value of D and C_0 to the discounted present value of future loan-aid and mixed-aid. The discounted present value of future loan-aid is: $[(L_{t+i} + L_{t+2} + \dots + L_{t+k}) / (1+0^{(t+k)})]$ and the present value of future mixed-aid is: $[(M_{t+i} + M_{t+2} + \dots + M_{t+k}) / (1+0^{(t+k)})]$, where L represents the dollar value of loan-aid for the specified period, M represents the dollar value of mixed-aid for the specified period, t indicates a time-cost of money index, and $(t+k)$ is the number of future periods in which the recipient perceives it will receive foreign assistance flows. The recipient does not know what type of foreign assistance the donor could offer in the future, only that some type of aid is implied. Thus, the recipient must determine the probability of receiving loan-aid and mixed aid and undertake a series of comparisons. When the donor implies future loan-aid or mixed-aid is possible, one period grant-aid will be fungible if: $[G, > P([(L_{t+i} + L_{t+2} + \dots + L_{t+k}) / (1+0^{(t+k)})]) + P([(M_{t+i} + M_{t+2} + \dots + M_{t+k}) / (1+0^{(t+k)})])] \text{ and } [CD, < *, *].$ If the donor offers one period time-aid or mixed-aid and signals no future grant-aid, the recipient undertakes a similar calculation to determine if foreign assistance is fungible. In general, when a donor offers one-period foreign and signals the possibility of that two types of foreign assistance may be offered in the future, recipients maintain incentives to treat foreign assistance as not fungible if the present discounted value of future aid is greater than the value of the current foreign assistance plus the value of the project to which foreign aid would have been diverted.

A donor may also offer one-period foreign assistance and intentionally signal the possibility of future foreign assistance flows. This category makes the donor's future intentions explicit, unlike the previous category where recipients could only infer future foreign assistance flows might occur but could not be completely certain. Donors may initially offer any type of foreign assistance and signal possible future offers of grant-aid, loan-aid, mixed-aid, or remain ambiguous as to the exact type of aid to be

clarify the analysis.

offered in the future. Recipients are assumed to be utility maximizers, so they should desire future foreign assistance receipts because they augment recipients' budgets and allow them to undertake projects that might not occur otherwise. When the donor explicitly signals the possibility of future foreign assistance flows, recipients' uncertainty diminishes and they gain incentives to use aid properly. If the donor is ambiguous as to the type of foreign assistance that will be offered in the future, the recipient must consider the three types of foreign assistance together and compare the value of future foreign assistance flows (and the associated value of potential fiscal options) against the current value of its fiscal options. The recipient views future foreign assistance receipts in total, so $V^{nk} = (V^{+y} + V^{14*10} + VM^k)$. The recipient then considers the value of future donor funded projects, V^{nk} , against the value of its other future fiscal options, V^{kj} , $V^{s(nk)}$, and $V^{f(n-y)}$. After the recipient has developed its valuations for future foreign assistance flows and its fiscal options, it compares them to the present value of its current assistance flows and current fiscal options. For foreign assistance to be fungible, $[Coi < (V^{wkj} +) >]$, where $\gamma, !$ B and $B = \{ V^{nk}, V^{s(nk)}, V^{f(n-y)} \}$. When the opportunity cost of not doing the current donor-funded development project is less than perceived value of future foreign assistance flows and the value of future fiscal alternatives, the recipient will have incentives to treat current aid as fungible.

The scenario of ambiguous signaling presents a special case of uncertainty for the recipient. In this model, the donor sends an ambiguous signal but actually knows what its future course of action will be; thus, information asymmetry exists between the donor and recipient with respect to future foreign assistance flows. The donor may desire to remain ambiguous to gain a strategic advantage in the fungibility game or to try to create an incentive for the recipient to behave in a fiscally responsible manner. More than likely, a donor would remain ambiguous to provide it with the maximum flexibility over its choice set. By remaining ambiguous, the donor can observe the recipient and determine if it uses one-period foreign assistance in an effective manner. If the recipient does use the assistance properly, the donor can offer more; if the recipient treats foreign assistance as fungible, the donor can choose not to

²³ It is assumed that the recipient considers these values as discounted and treats them as such.

offer further aid. An ambiguous signal amounts to the donor saying "I may offer you future foreign assistance, but then again I might not." Regardless of the reason for the donor's ambiguous stance, the recipient does not know whether foreign assistance will be offered in period $(t+k)$ or the conditions under which it will be offered.

From the recipient's perspective, the ambiguous signal is especially problematic because it requires them to gauge the probability that the recipient will offer future foreign assistance and then determine their fiscal behavior. Unlike the "no future" signal, where the possibility of future foreign assistance is implied and the "possible future" signal that makes future flows explicit, the "ambiguous" signal does not provide guidance to inform the recipient's fiscal behavior. Assuming the donor will base decide whether or not to provide assistance in period $(t+k)$ based on the recipient's actions in period t , the recipient must decide if it should adopt a risk-adverse, risk-neutral, or risk-seeking stance. A risk-adverse stance assumes the recipient will be offered additional funds in the future if it uses current assistance properly; thus, foreign assistance is not fungible. Thus, $(V_D > C_D)$ and the recipient perceives $(V_{A,t} > (VA_{t,1} + VA_{t,2} + \dots + VA_{t,t}))$. A recipient remains risk-neutral if it is indifferent between receiving and not receiving future foreign assistance flows; $(V_D = C_D)$ and the risk-neutral recipient perceives $(V^{\wedge} = (V_{A,t,1} + VA_{t,2} + \dots + VA_{t,*}))$. The risk-seeking recipient will treat current foreign assistance as fungible, assuming that future aid is unlikely but a random possibility. The risk-seeking recipient believes future foreign assistance receipts will be offered randomly, so it should allocate current foreign assistance in a manner that maximizes utility given the country's budget constraints and needs. Thus, $(V_D \bullet C_D)$ and the recipient perceives $(V_{A,t} \bullet H (V_{A,t,1} + V^* \dots + V_{A,t,*}))$.

Multiple Period Assistance

One option a donor maintains is to offer any type of foreign assistance over multiple periods²⁴ of time. The donor could offer multiple period assistance for capital-intensive projects, such as developing transportation infrastructure or sanitation systems, or for development projects that require recurring funding, such as health care delivery networks. When the donor and recipient enter this type of project,

both parties know the type of foreign assistance offered and the length of the funding period. The recipient does not know whether or not the donor will extend future foreign assistance once the multiple period contract expires except through the signals the donor sends when it enters into the contract. The main difference between the single period and multiple period situations is that in the latter, the recipient receives a set amount and type of foreign assistance that reoccurs over a finite number of known periods.

When a donor offers multiple period grant-aid and signals no future foreign assistance of any type will be offered, the recipient has little incentive to use the grant-aid for its intended purpose. The recipient knows its total grant-aid over period $(\dots (t+k))$ is: $G^t = (G_t + G_{t+1} + \dots + G_{t+k})$, and that it will receive with certainty G_t every period regardless of its fiscal behavior. Thus, the recipient maintains no incentives *not* to alter its fiscal behavior in response to foreign assistance receipts, since it knows with complete certainty it will receive a set amount of grant-aid for every year of the foreign assistance contract and that its fiscal behavior will not affect the possibility of receiving additional foreign assistance flows once the contract expires. Additionally, the recipient may adjust its grant-aid allocations each year depending on its particular fiscal needs. For example, a recipient may choose D in period t , C in period $(t+1)$, and F in period $(t+2)$ because its grant receipts in the next period are not dependent on the fiscal behavior of previous periods. When donors offer multiple period grant-aid and signal the possibility that no future foreign assistance is possible once the contract expires, recipients will not possess any incentives to spend grant-aid properly. If the donor offers loan-aid under these circumstances, the recipient will have incentives not to treat the assistance as fungible only because it imposes a future cost of borrowing. The recipient receives loans in periods $(\dots (t+k))$ for a total amount: $L^t = (L_t + L_{t+1} + \dots + L_{t+k})$. However, the recipient incurs interest costs on its loan-aid equal to $[L^t - (L^t * (1+r)^k)]$. Thus, loan-aid is fungible if $[(L^t * (1+r)^k) < x^t]$, just as it was in the single period scenario. However, because loan-aid occurs over a period of time, the recipient must consider the total cost of loan-aid when determining whether or not it is fungible. Alternately, the donor could offer multiple period mixed-aid, composed of a fixed ratio of grant-aid and loan-aid. The recipient could receive a total amount of: $M^t = (M_t + M_{t+1} + \dots + M_{t+k})$.

$(t+k) ! 2.$

+ M_{t+k}) for periods (f... $(t+k)$), where $M_t = (G_t + L_t)$. The fungibility of multiple period mixed-aid depends on the ratio of grant-aid to loan aid. For every period, mixed-aid imposes a cost of $(L_t * (1+r)^t)$ for the recipient. To determine if mixed-aid is fungible, recipients compare the cost of mixed-aid the grant-aid component. If the grant-aid component is worth more than the cost of the loan-aid component, recipients will treat mixed-aid as fungible. That is, if $[G_t > (L_t * (1+r)^t)]$ and $[C_t < x_t]$, the recipient will treat mixed-aid as fungible.

When donors offer multiple period foreign assistance and signal that one type of aid will not be offered in the future, they imply that the other two types of aid remain a possibility. Fungibility depends on whether or not a recipient perceives the potential benefits of receiving a type of foreign assistance after the initial contract expires as more valuable than the benefits generated through fungible behavior. The recipient makes calculations similar to those of the single period scenario.

When the donor offers multiple period foreign assistance and signals explicitly that future foreign assistance receipts will occur, the recipient's fiscal behavior changes slightly from that which occurs under the single period scenario. When the donor offers grant-aid for multiple periods and explicitly signals future grant-aid after the initial contract expires, the recipient should possess incentives to not treat foreign assistance as fungible. Because recipients are utility maximizers, they desire to maximize the amount of grant-aid they receive under the multiple period contract and in the future. Thus, grant-aid will be fungible only if $(G_t > G_{t'})$ and $(x_t > y_{t'})$, where $G_{t'}$ represents the amount of grant-aid the recipient believes it will receive. The recipient must perceive its current grant-aid to be more substantial than its future grant-aid, and that the value incurred by not doing the donor-sponsored development project outweighs the value that could be generated by future fiscal choices financed through donor funds. Knowing they may receive future grant-aid creates an incentive for utility-maximizing recipients to treat grant-aid as not fungible.

CONCLUSION

For the most part, the existing literature on foreign assistance does not consider how donor-recipient interactions over time may influence the fungibility of foreign assistance and, consequently, the

effectiveness of foreign aid flows. The current literature assumes donor-recipient interactions are static and only tests the effectiveness and fungibility of foreign assistance through macroeconomic models. This research begins to address these deficiencies by developing a model of how donors and recipients interact overtime and the incentives various interactions produce that influence the degree to which foreign assistance is fungible. The model demonstrates that different types of foreign assistance, along with the length of the foreign assistance contract and the donor's signals regarding the possibility of future foreign assistance flows, determine the recipient's incentives to treat foreign assistance as fungible or not. The fungibility of foreign assistance depends on the type of aid, if aid occurs over a single period or multiple periods, and whether or not the donor explicitly signals that it will offer foreign aid flows in the future.

In general, when a donor offers grant-aid and signals that no future foreign assistance will be offered, recipients have no incentive to use aid for its intended purposes. Under these circumstances, recipients will direct grant-aid toward the fiscal behavior they perceive as generating the highest value: paying off debt, lowering taxes, or increasing discretionary spending. Recipients maximize their utility by allocating foreign assistance to the expenditures that generate the highest value, which is not necessarily the donor-sponsored development project. If the donor signals some type of foreign assistance may occur in the future, a recipient will treat grant-aid as fungible if the value of doing so exceeds the expected value of future foreign aid and the value of the expenditures that could have been undertaken with the future assistance. The model demonstrates that grant-aid is highly fungible because it does not impose a cost on the recipient. Recipients may determine to use grant-aid for purposes other than that intended by the donor because the grant is a supplement to its domestic revenue and does not impose a cost or create a debt obligation. If recipients are rational utility maximizers, it is in their best interest to allocate grant-aid toward expenditures that generate the highest value, especially if they know no future foreign assistance will be offered.

Overall, loan-aid is not as fungible as grant-aid because it imposes a cost on the recipient. Loan-aid creates a debt obligation that must be repaid in the future and generates an interest cost. Recipients

must repay the loan and the incurred interest, which creates an incentive to use loan-aid for the intended development project. Using the loan-aid to finance tax cuts or make payment on debt obligations does not maximize the recipients' utility, since the loan's principal plus interest must be repaid in the future from the recipient's budget. The recipient could use loan-aid to make payments on debt obligations if the interest rate of the loan is less than that of the debt obligation, but this is only a temporary solution to fiscal deficits. Even if the interest rate on loan-aid is less than that of outstanding debt obligations, the recipient still maintains incentives not to use loan-aid in this manner. The recipient still must repay loan-aid and interest costs and, if the recipient is uncertain of its future tax receipts or the period of the loan-aid is such that the incurred interest costs exceed that of the current debt, the recipient will have an incentive not to treat loan-aid as fungible.

Recipients will treat mixed-aid as fungible depending on the ratio of grant-to-loan components. If the mixed-aid is composed mostly of grants, the recipient will have incentives to treat mixed-aid as grant-aid because the costs imposed by the loan-aid component are low. Conversely, when the loan-aid component is greater than the grant-aid portion of mixed-aid, recipients will incur costs and possess incentives not to treat mixed-aid as fungible. The fungibility of mixed-aid depends on its composition and the potential costs it imposes.

Assuming that donors are concerned about the fungibility of foreign assistance, they should work with recipients to develop better incentives to encourage aid effectiveness. First, loan-aid creates the strongest incentive for recipients not to treat foreign assistance as fungible since it imposes a debt obligation and generates interest costs. Donors can use loan-aid to discourage fungibility of foreign assistance. However, because many foreign assistance recipients already carry substantial debt loads, recipients and donors may not wish to exacerbate fiscal deficits. If donors and recipients are determined to use grant-aid to finance development projects, they must develop strong monitoring and enforcement mechanisms to prevent the fungibility of foreign assistance. Donors must insist on better, more transparent budget practices that allow them to observe recipients' foreign assistance expenditures. Donors should assist recipients in improving their budget and accounting practices when foreign

assistance, especially grant-aid, is offered. Donors should also create mechanisms to sanction recipients when foreign assistance is treated in a fungible manner. One way of reducing the incentives for grant-aid fungibility would be to release funds over a period of time instead of in a lump-sum. Once valid budgetary processes are in place and donors can monitor recipients' foreign assistance expenditures, they can release grant-aid over time based on a recipient's fiscal behavior. Dispersing grant-aid over time based on the recipient's fiscal behavior creates an incentive for the recipient to not treat grant-aid as fungible.

Future research should examine foreign assistance fungibility when one donor may choose to allocate foreign assistance among multiple recipients. How does the existence of multiple recipients affect the degree to which foreign assistance is fungible? If a donor can clearly signal to each recipient that future foreign assistance receipts will depend on the relative effectiveness of aid, recipients will have incentives not to treat aid as fungible. When a donor can offer foreign assistance to one or more recipients based on how well each recipient utilizes aid flows, recipients will possess incentives to use foreign assistance for the intended purpose so they do not lose future aid flows to other countries who do not treat aid as fungible. The existence of multiple recipients could create a competitive environment and reduce the degree of fungibility; future models should examine this dynamic. Additional research should expand on this idea and examine how multiple donors and multiple recipients interact and how this affects fungibility. Introducing multiple donors who may not coordinate their activities could allow recipients to play donors off one another or otherwise undermine the effectiveness of foreign assistance. Future research should explore this possibility as well.

FIGURE 1A: Initial One-Shot Game

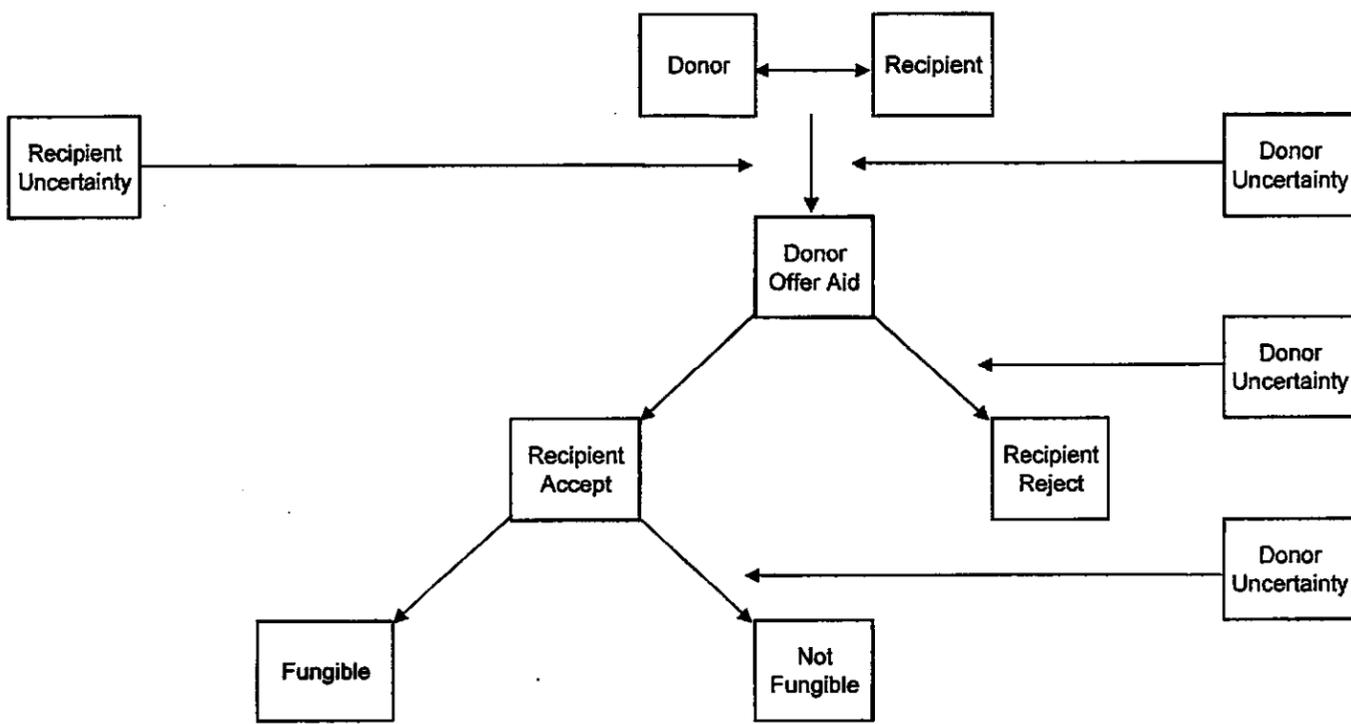


FIGURE 1B: Iterated Game (The Foreign Assistance Situation)

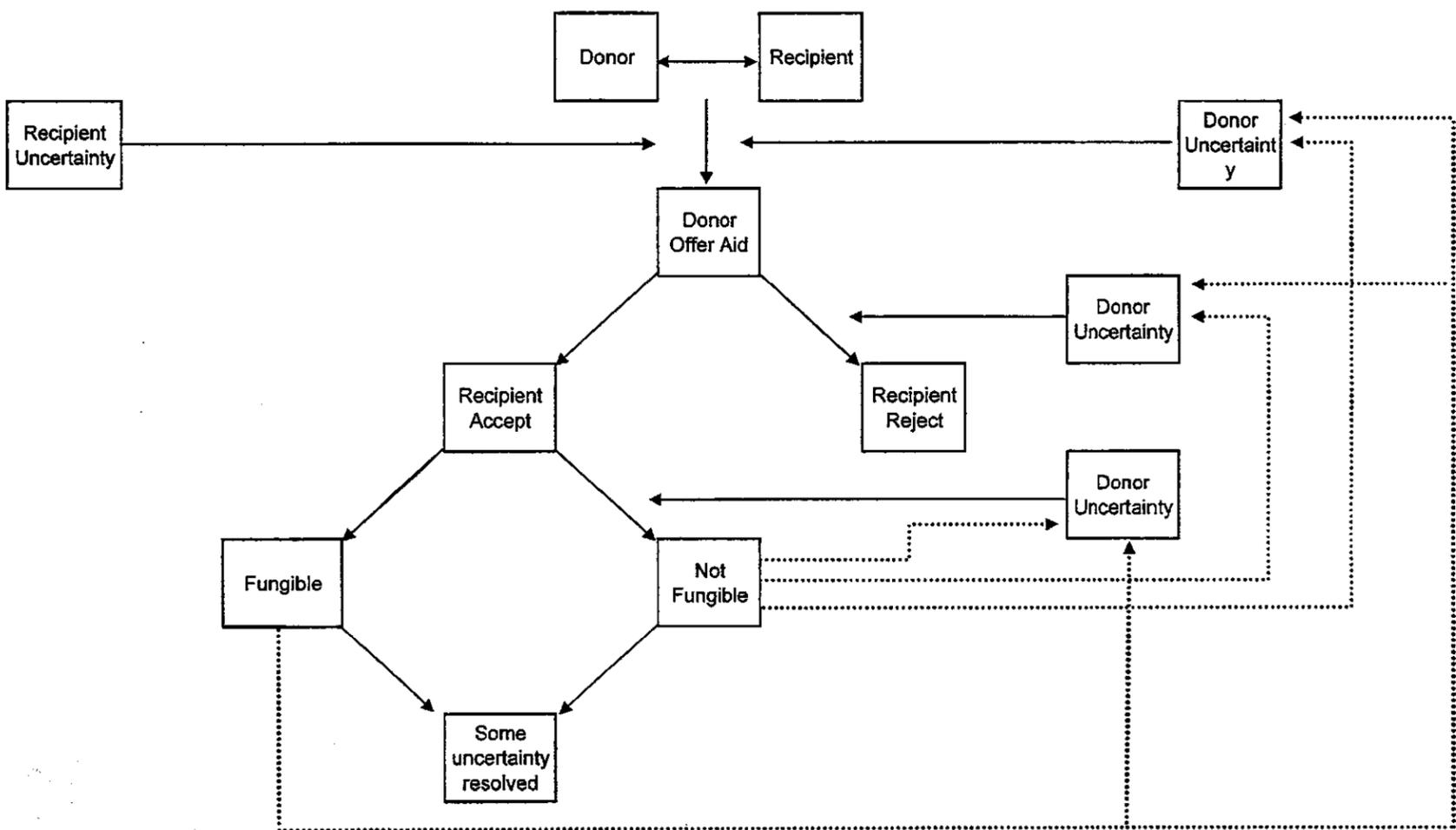


FIGURE 2: The Fungibility Game, Stage 1

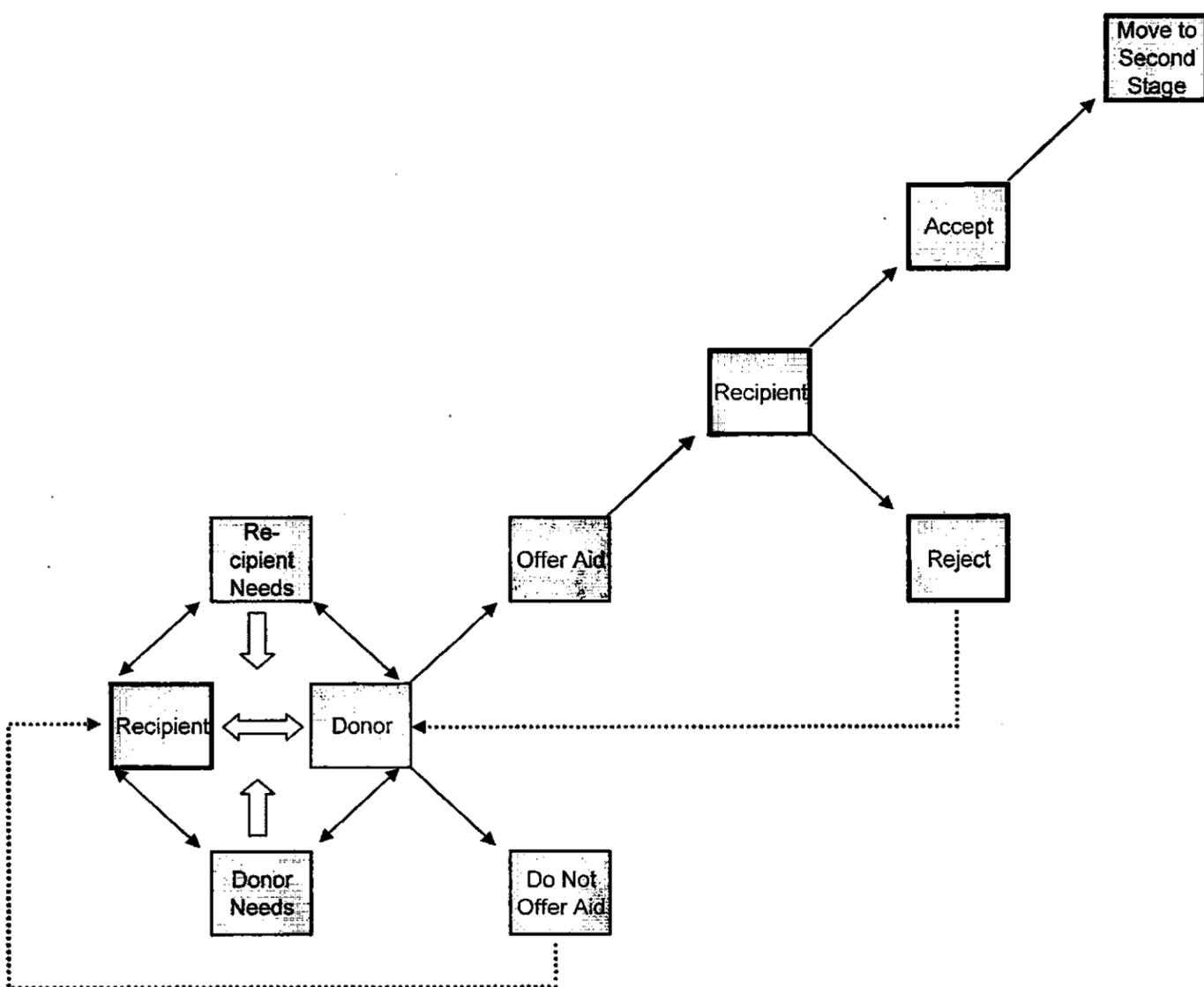
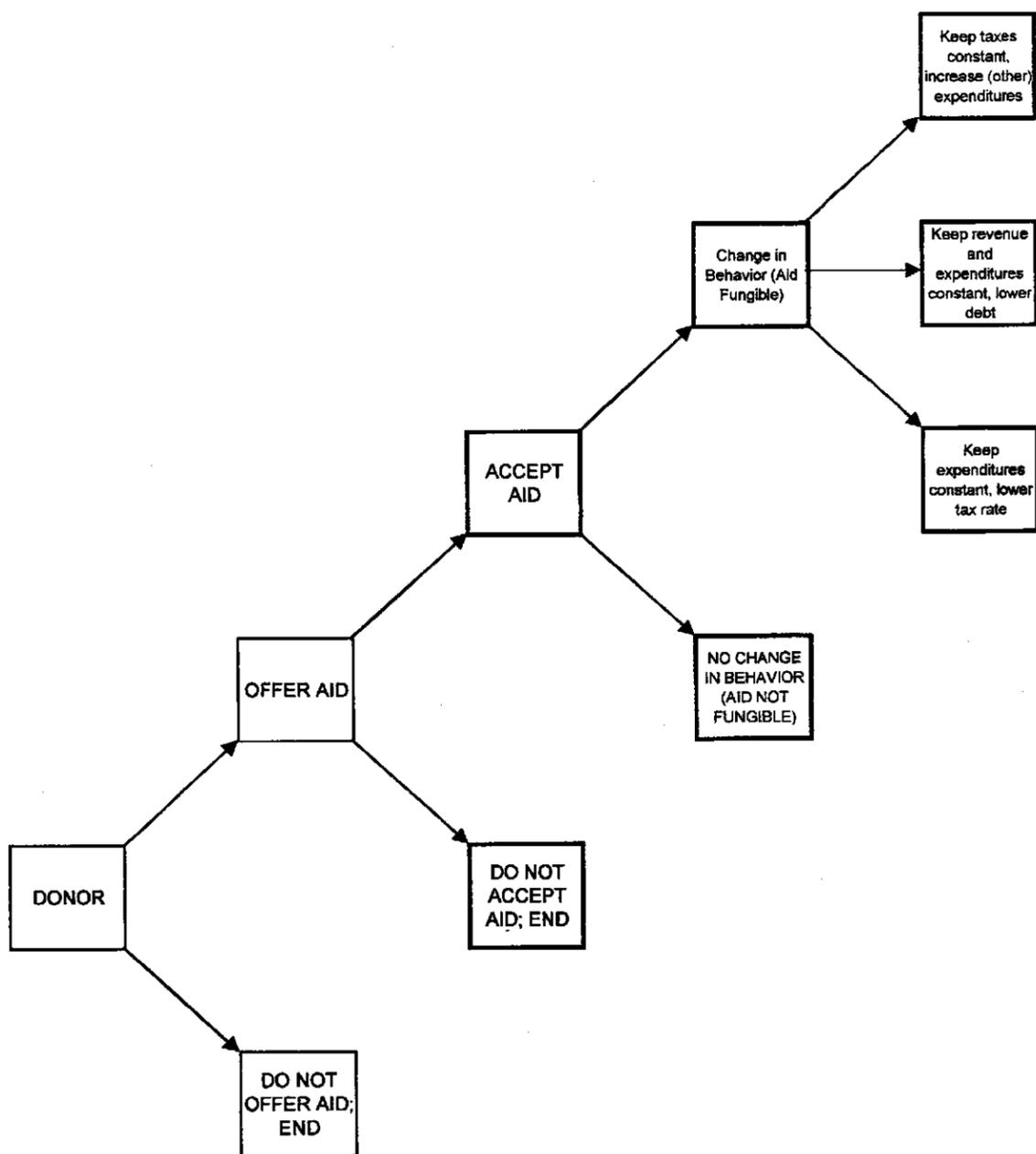


TABLE 1: Donor Offers and Signals

	AND SIGNAL POSSIBILITY OF...											
	NO FUTURE OF ...				POSSIBLE FUTURE OF...				OR REMAIN...			
INITIAL DONOR OFFER:												
One time grant-aid	grant	loan	mixed	ambiguous	grant	loan	mixed	ambiguous	ambiguous			
One time loan-aid	grant	loan	mixed	ambiguous	grant	loan	mixed	ambiguous	ambiguous			
One time mixed-aid	grant	loan	mixed	ambiguous	grant	loan	mixed	ambiguous	ambiguous			

	AND SIGNAL POSSIBILITY OF ... AFTER PERIOD EXPIRES											
	NO FUTURE OF...				POSSIBLE FUTURE OF ...				OR REMAIN...			
INITIAL DONOR OFFER:												
Multiple period grant-aid	grant	loan	mixed	ambiguous	grant	loan	mixed	ambiguous	ambiguous			
Multiple period loan-aid	grant	loan	mixed	ambiguous	grant	loan	mixed	ambiguous	ambiguous			
Multiple period mixed-aid	grant	loan	mixed	ambiguous	grant	loan	mixed	ambiguous	ambiguous			

FIGURE 3: The Fungibility Game, Recipient's Choices



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